Food web structure in a rapidly changing coastal environment: the West Antarctic Peninsula

Anthony Voisin

Lepoint G., Danis B., Guillaumot C., Kristiansen A., Pasotti F., Saucède T. & Michel L.N.

IsoEcol 11.5 virtual meeting

May 19-21, 2021

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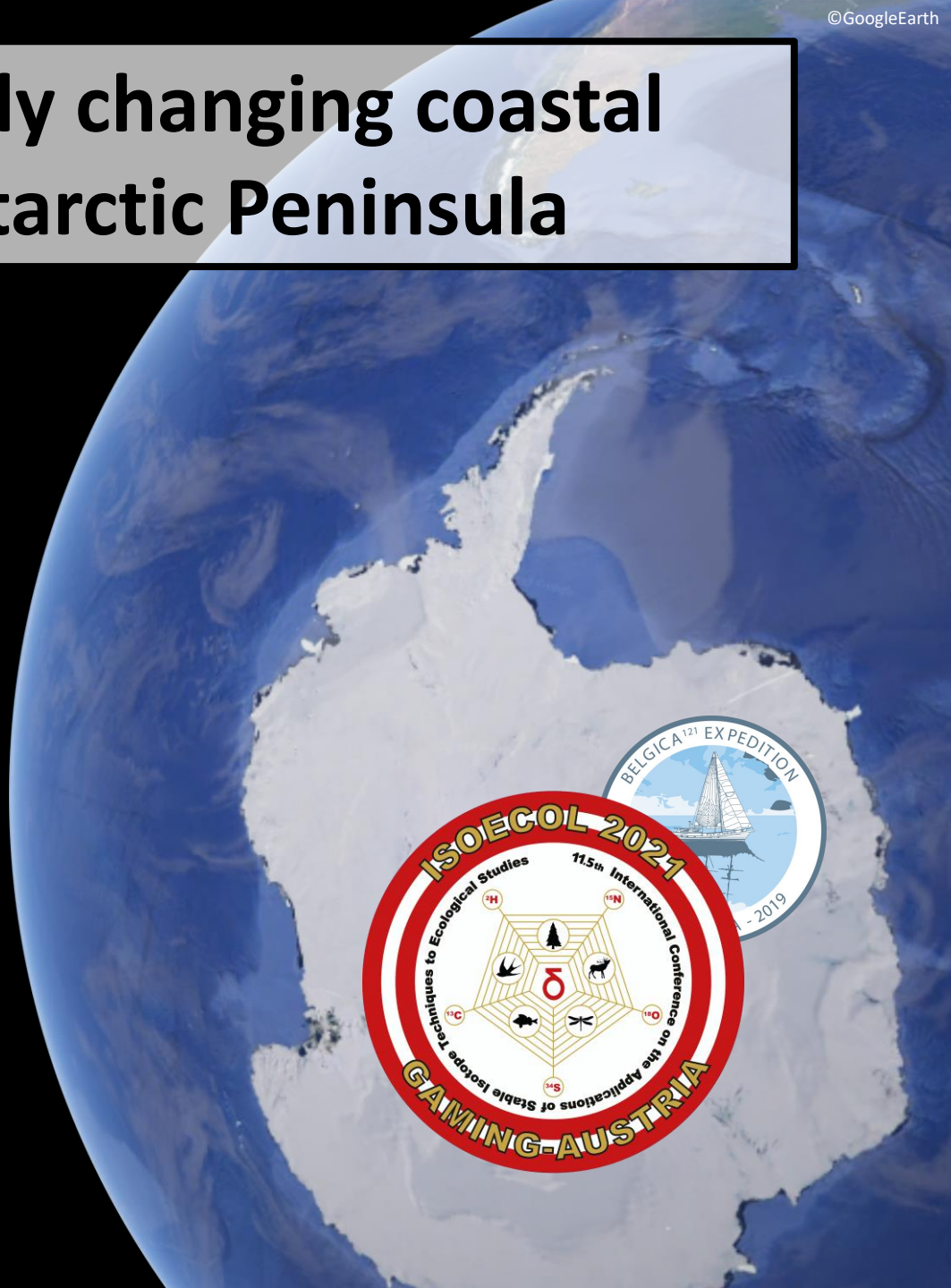
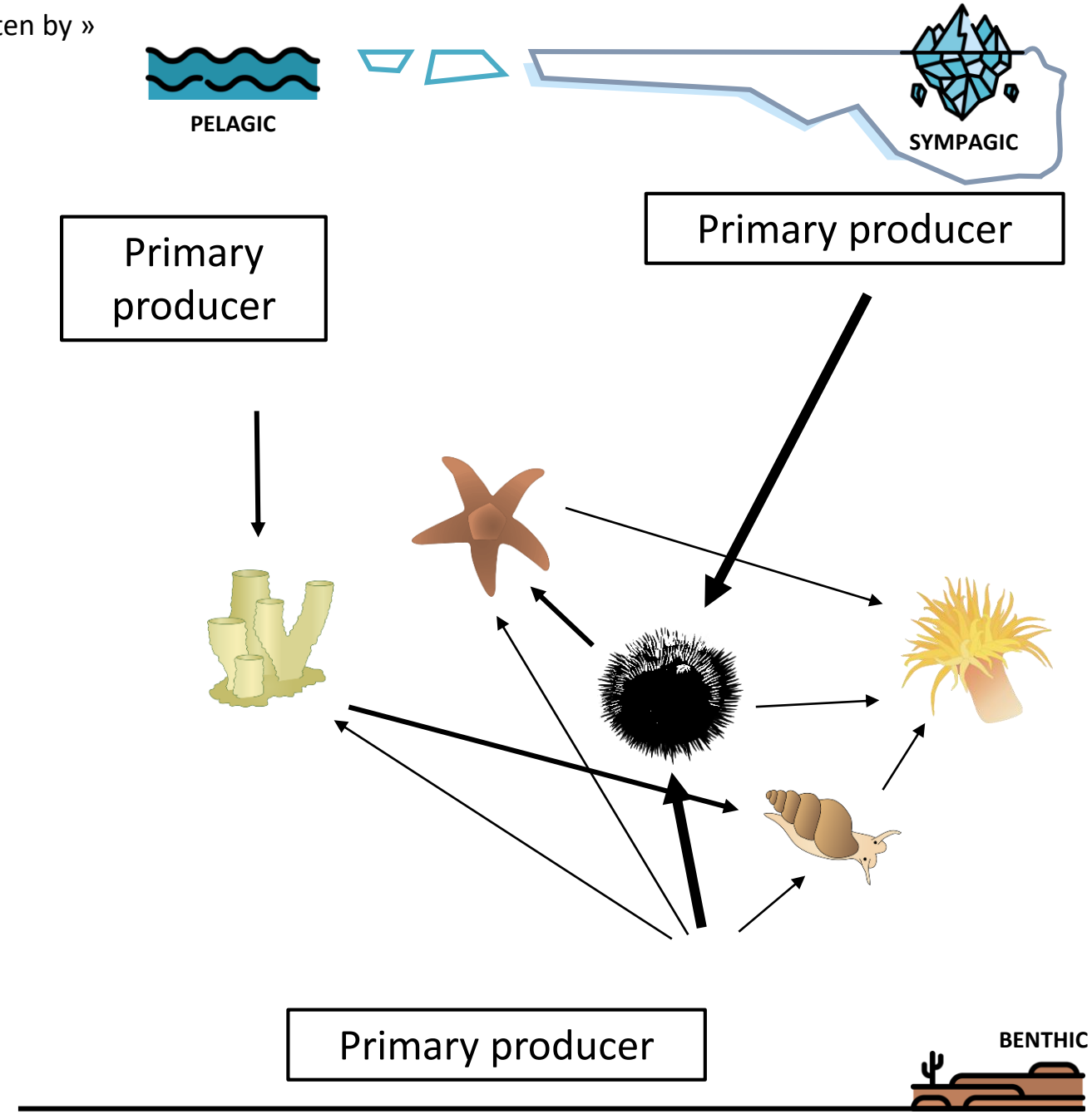


CONTEXT & OBJECTIVES

Benthic food webs in Antarctica

⇨ Complex structure



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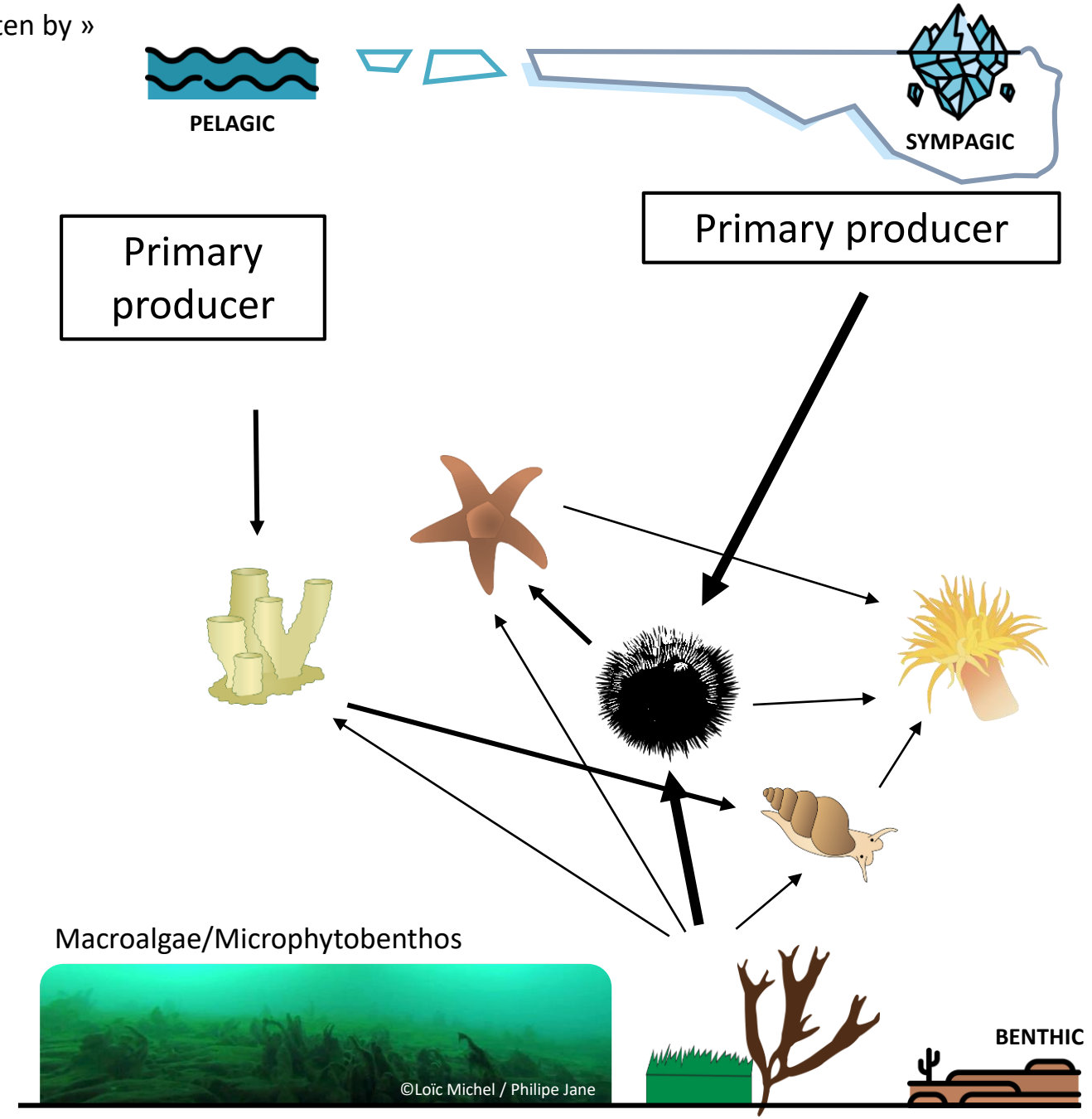

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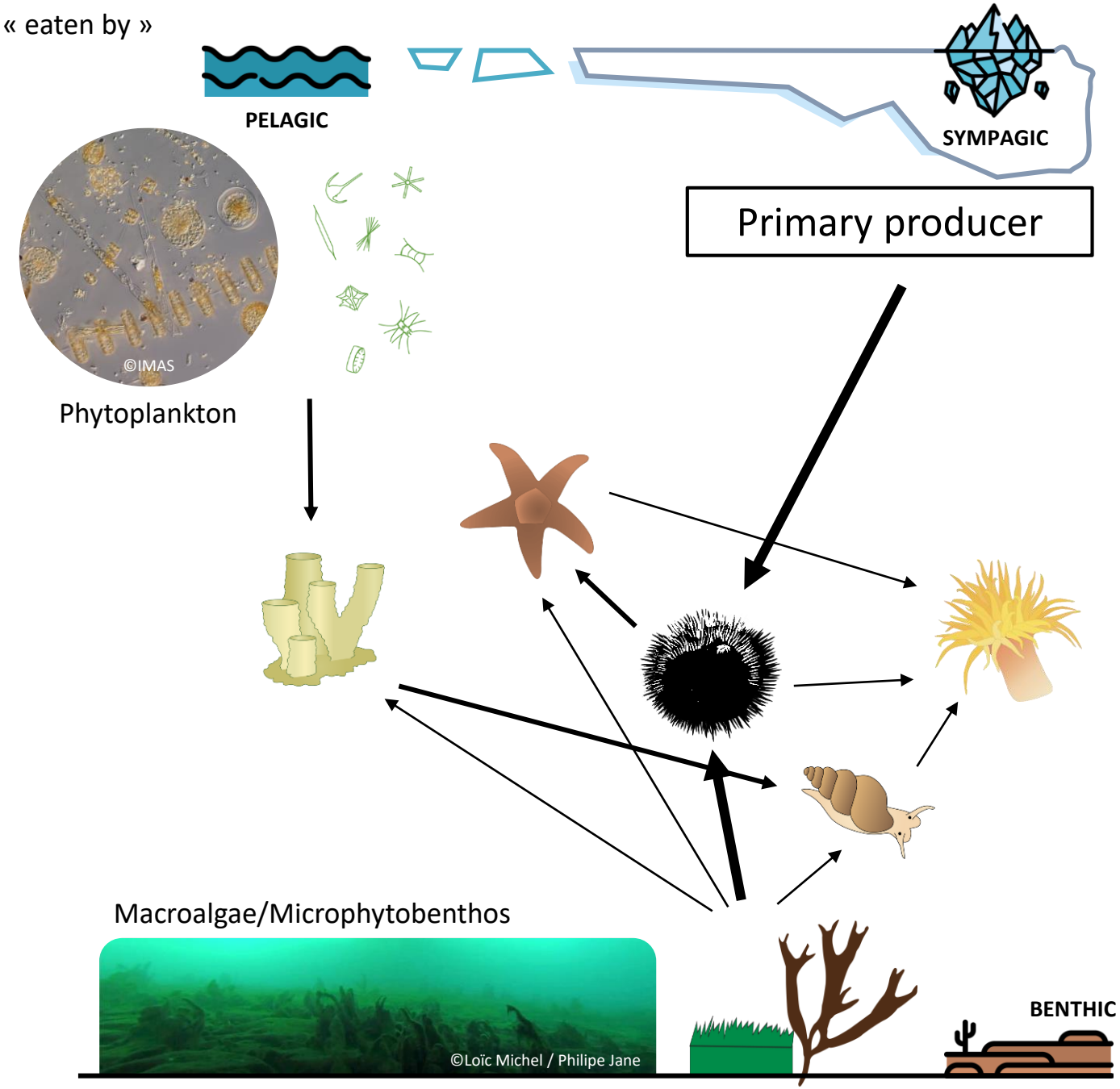

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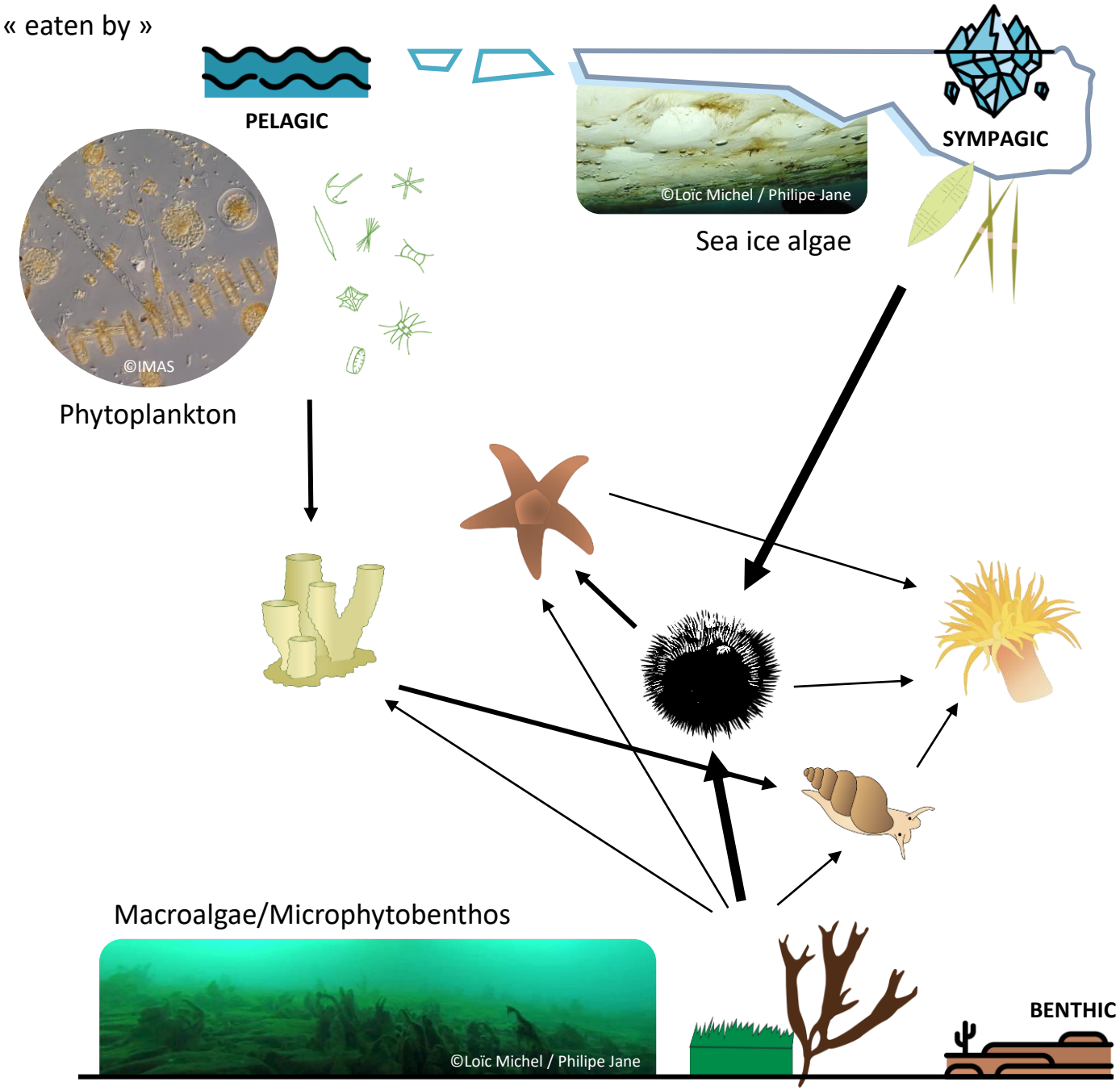

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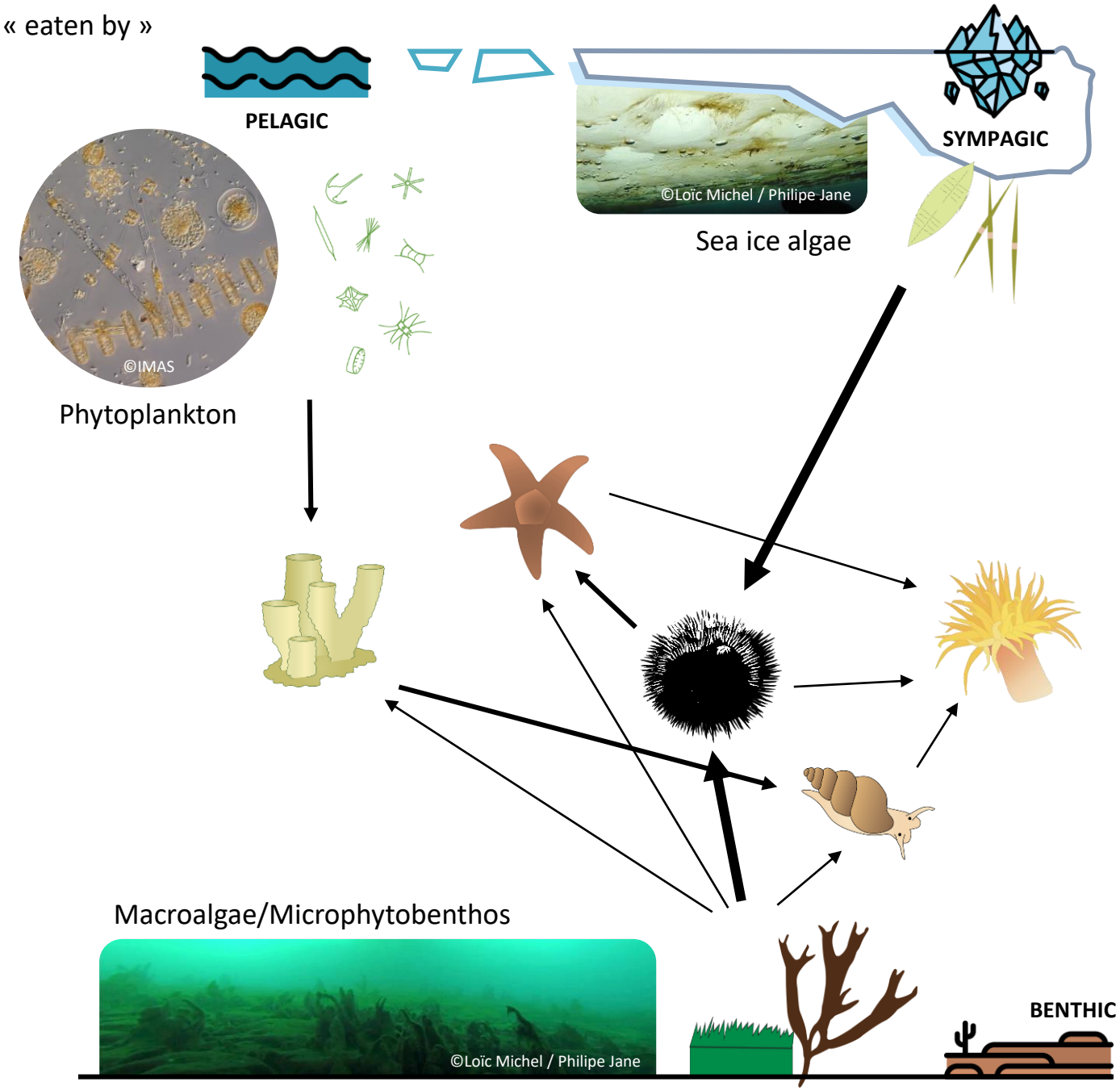
⇨ Environmental gradient



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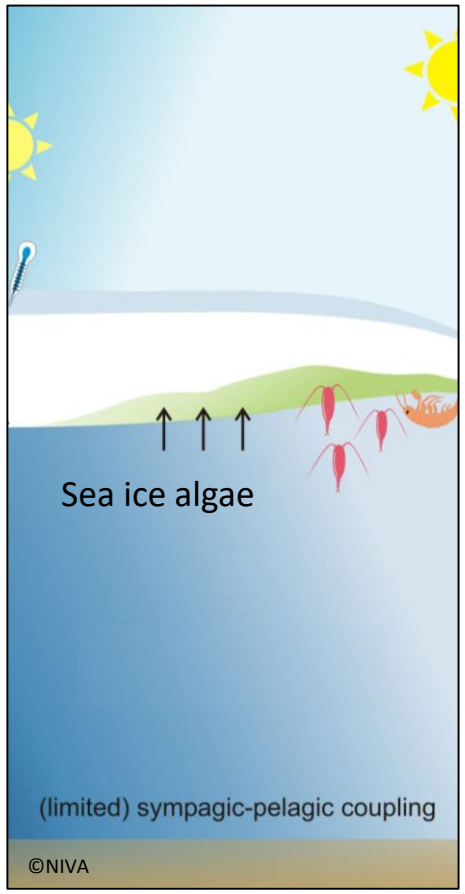

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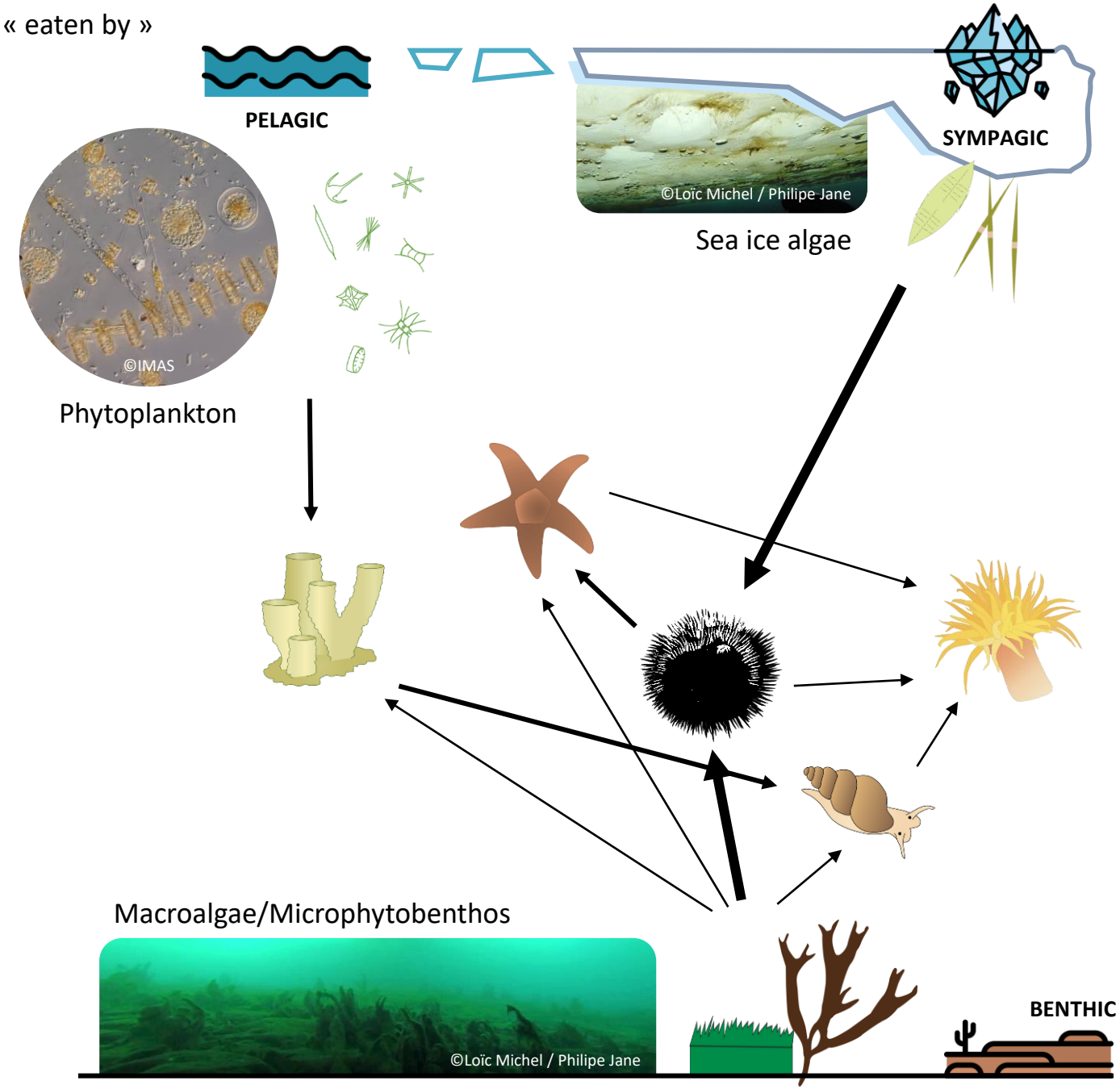

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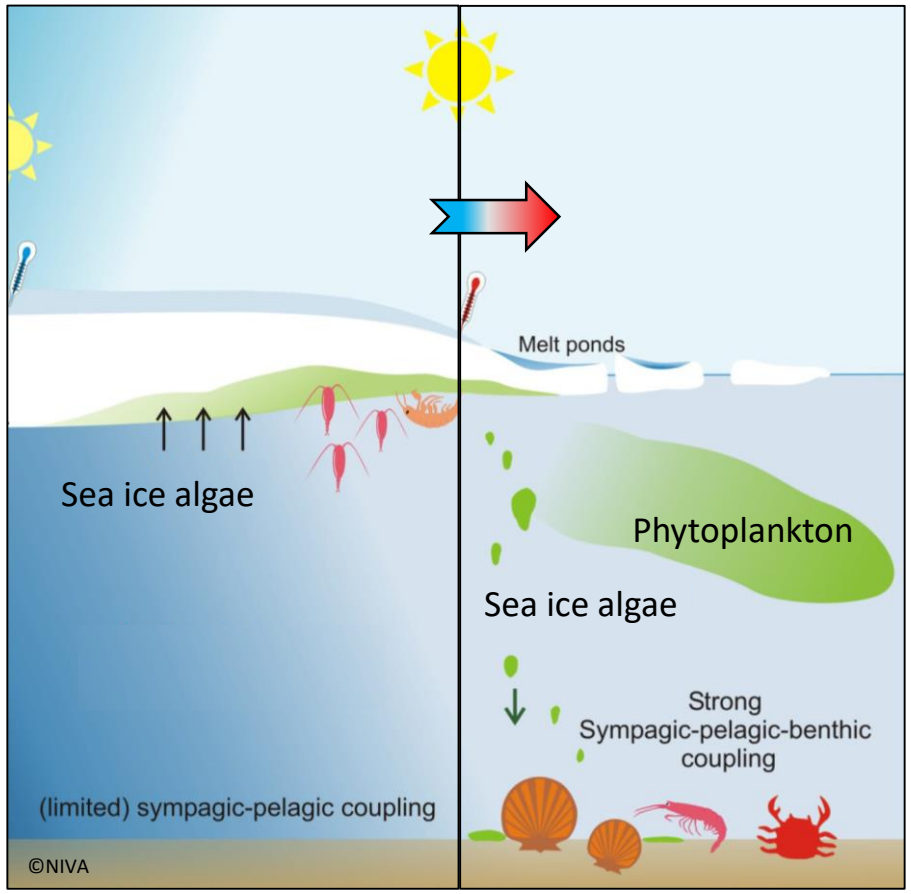

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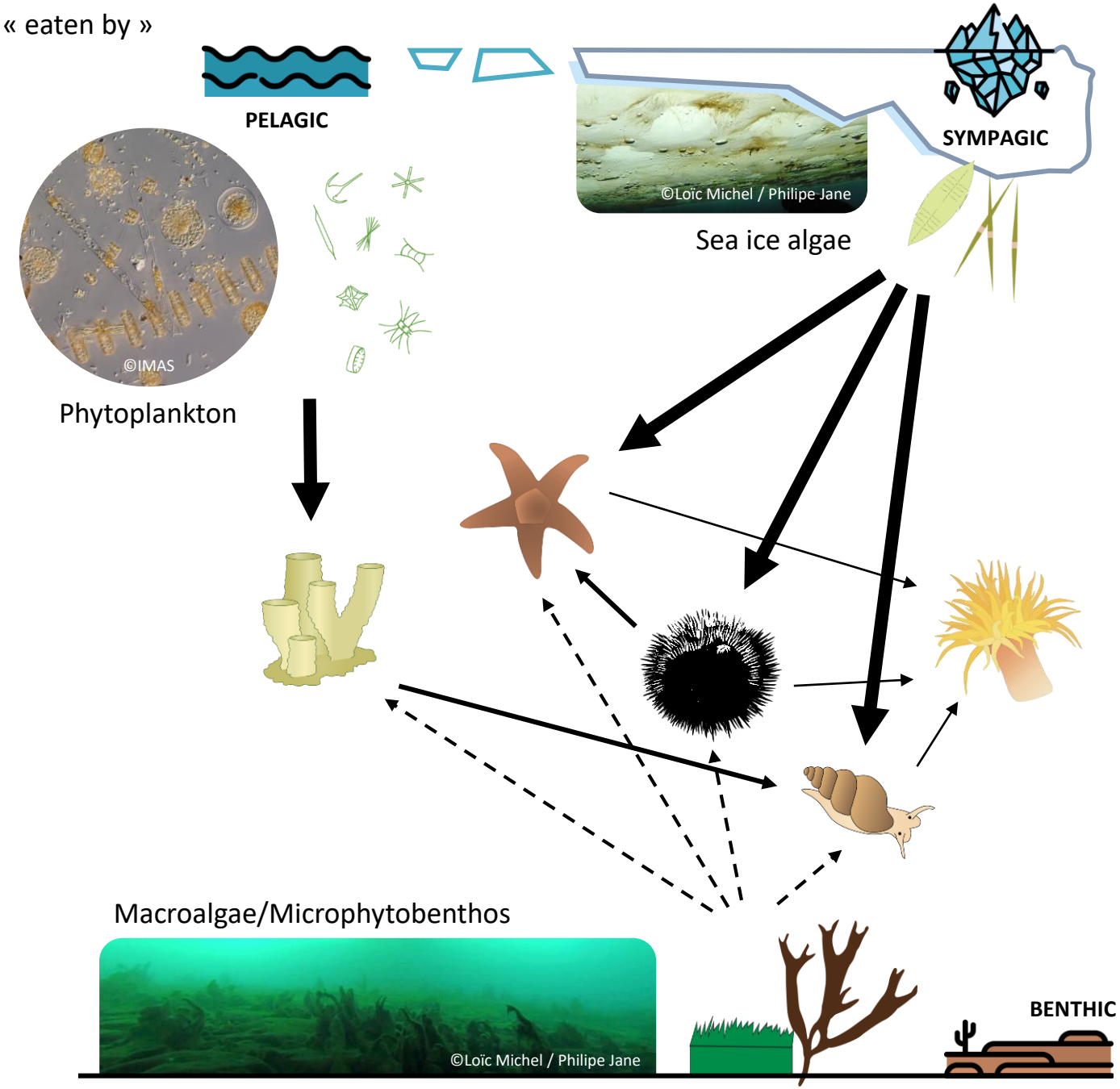

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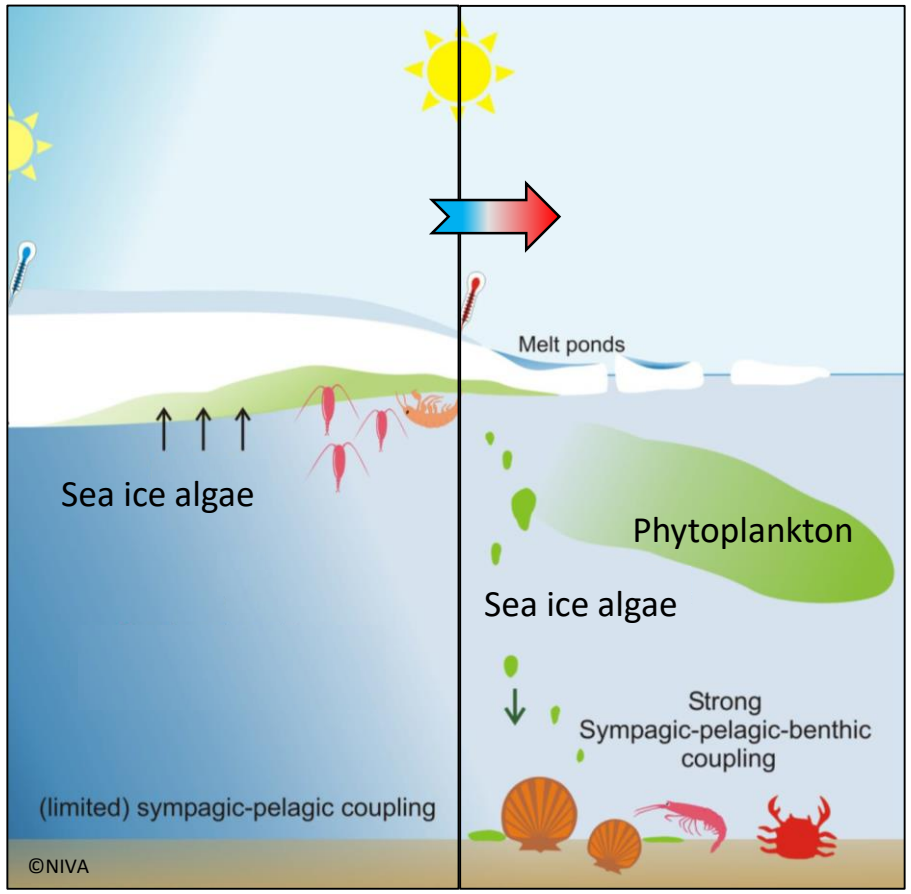

Impact of sea ice change on trophic interactions in benthic communities?

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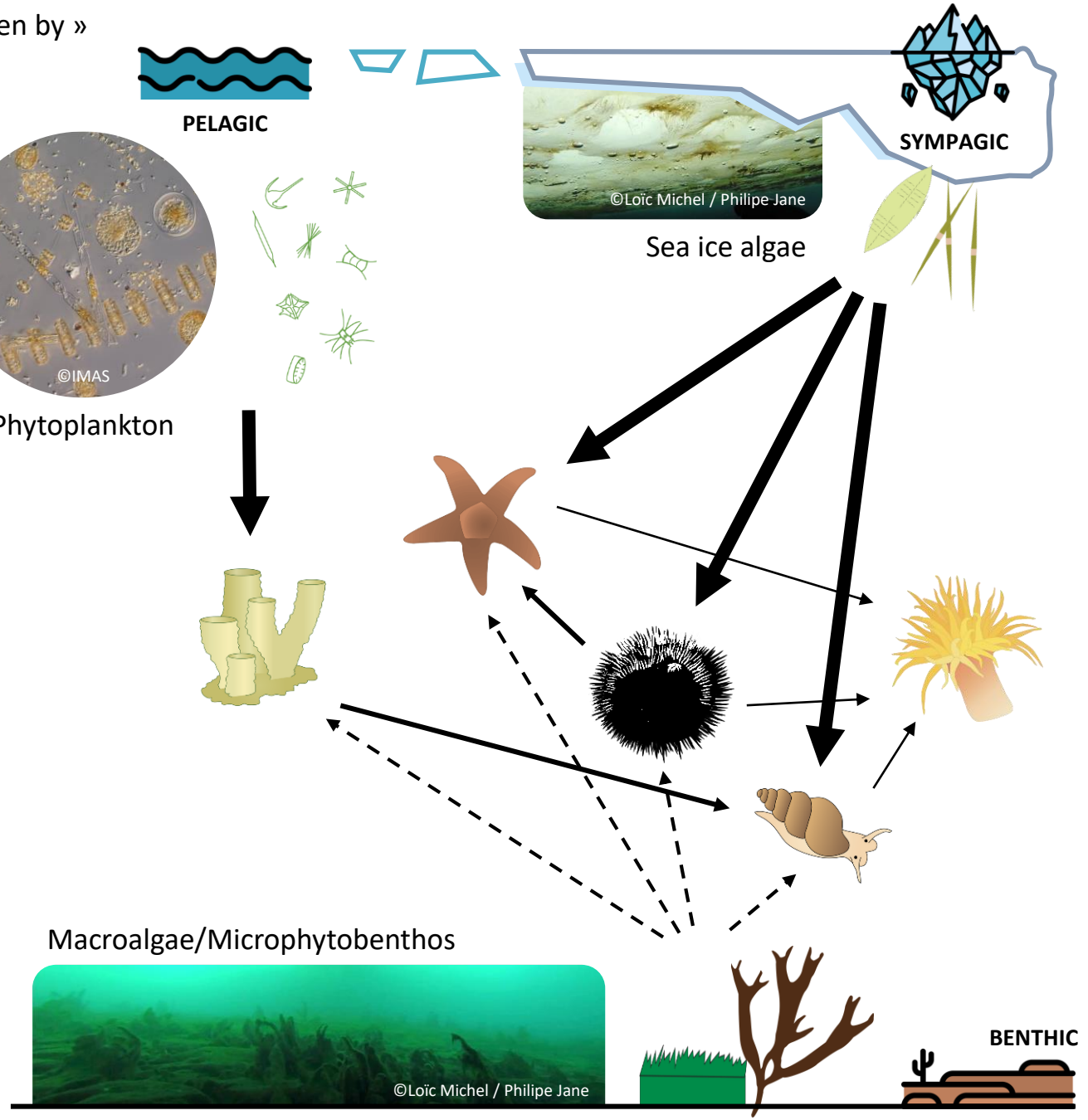
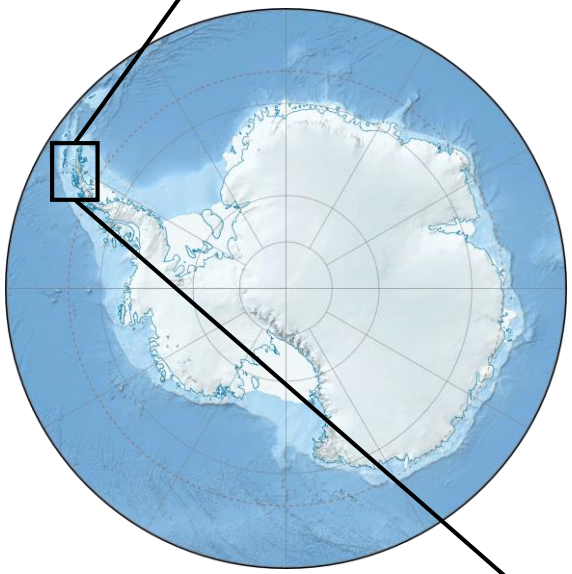
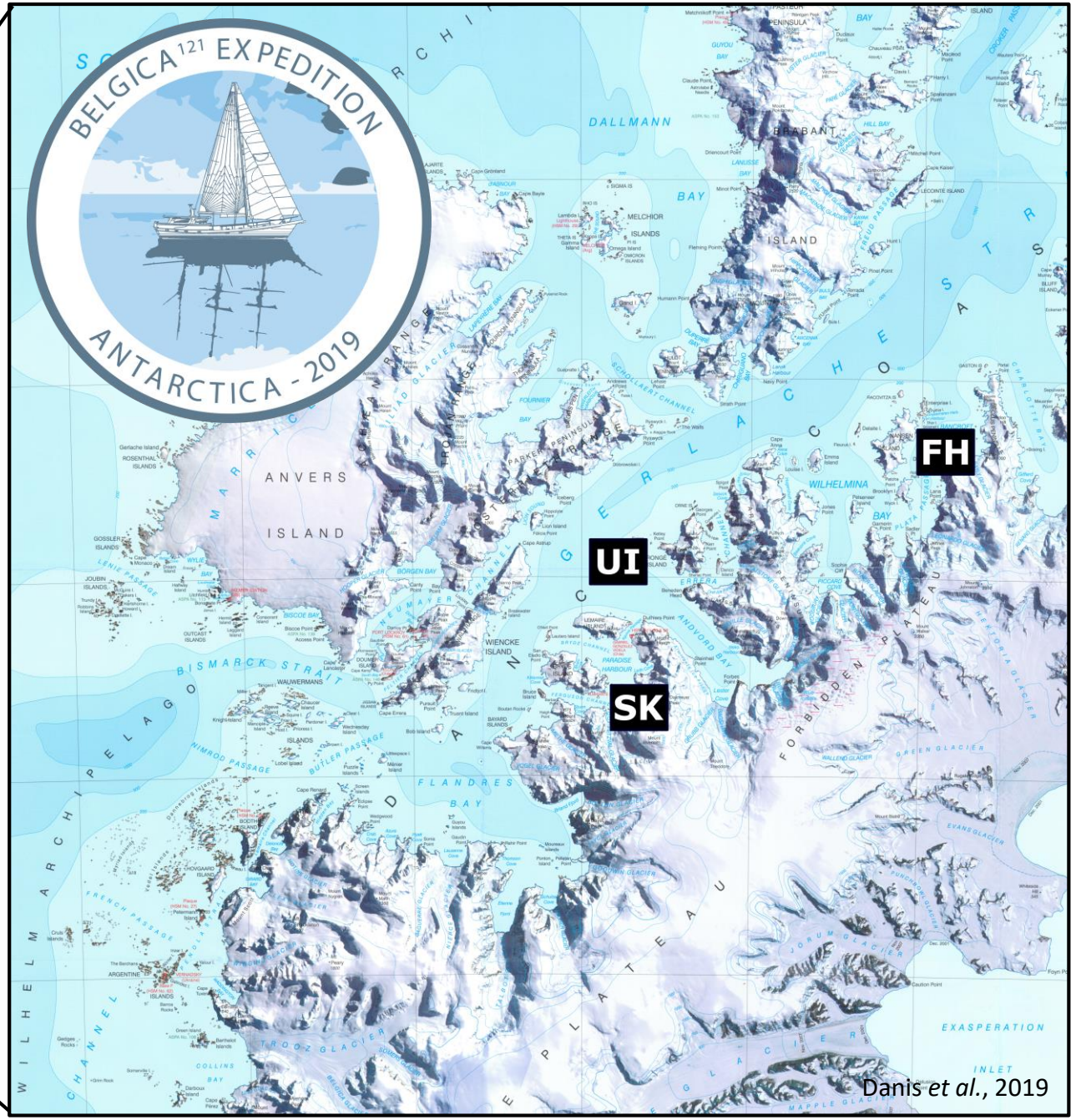


CONTEXT & OBJECTIVES

West Antarctic Peninsula

- ⇨ Gerlache Strait
  - Føyn Harbour (FH)
  - Skontorp Cove (SK)
  - Useful Island (UI)





Danis *et al.*, 2019

CONTEXT & OBJECTIVES

West Antarctic Peninsula

⇨ Differences in environmental features
- Ice disturbance: glacier calving & iceberg scouring
- Communities
- Seabed characteristics

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- Low to no ice disturbance
- No penguin colony
- Rocky/gravely substrate with mud

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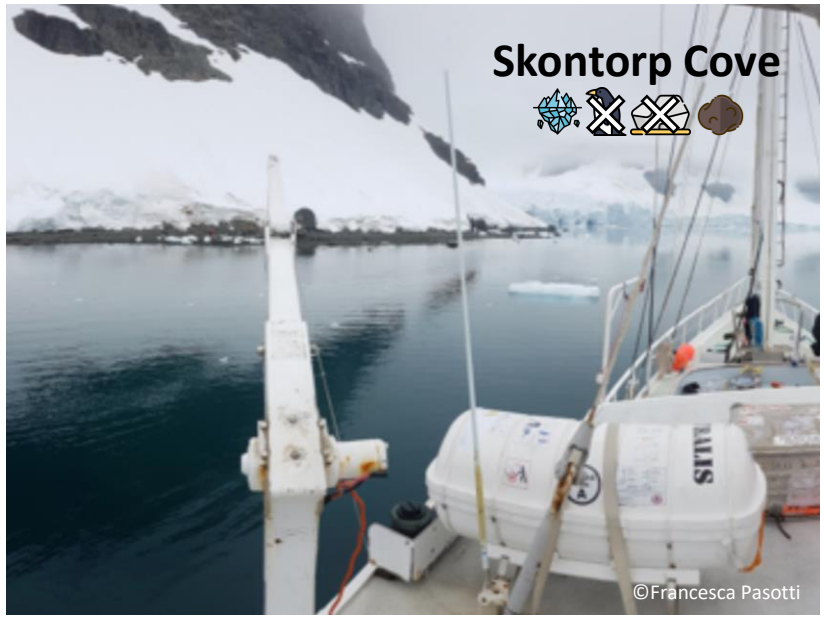

- High ice disturbance
- No penguin colony
- Muddy bottoms

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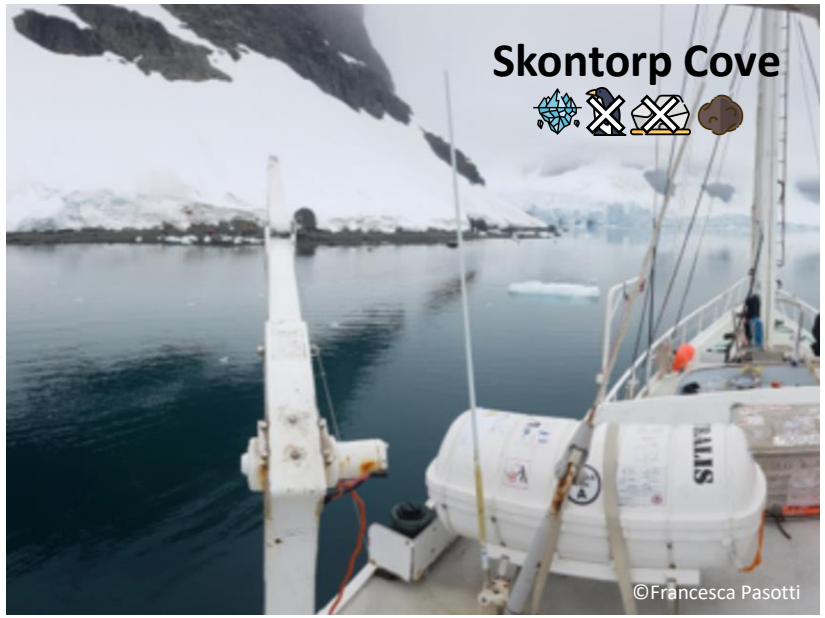

- High ice disturbance
- No penguin colony
- Muddy bottoms

- Regular iceberg disturbance
- Gentoo penguin colony
- Rocky to muddy substrate

CONTEXT & OBJECTIVES

Preparation

⇨ ~650 organisms from several functional groups: food sources, grazers, suspension feeders, omnivores, predators, scavengers

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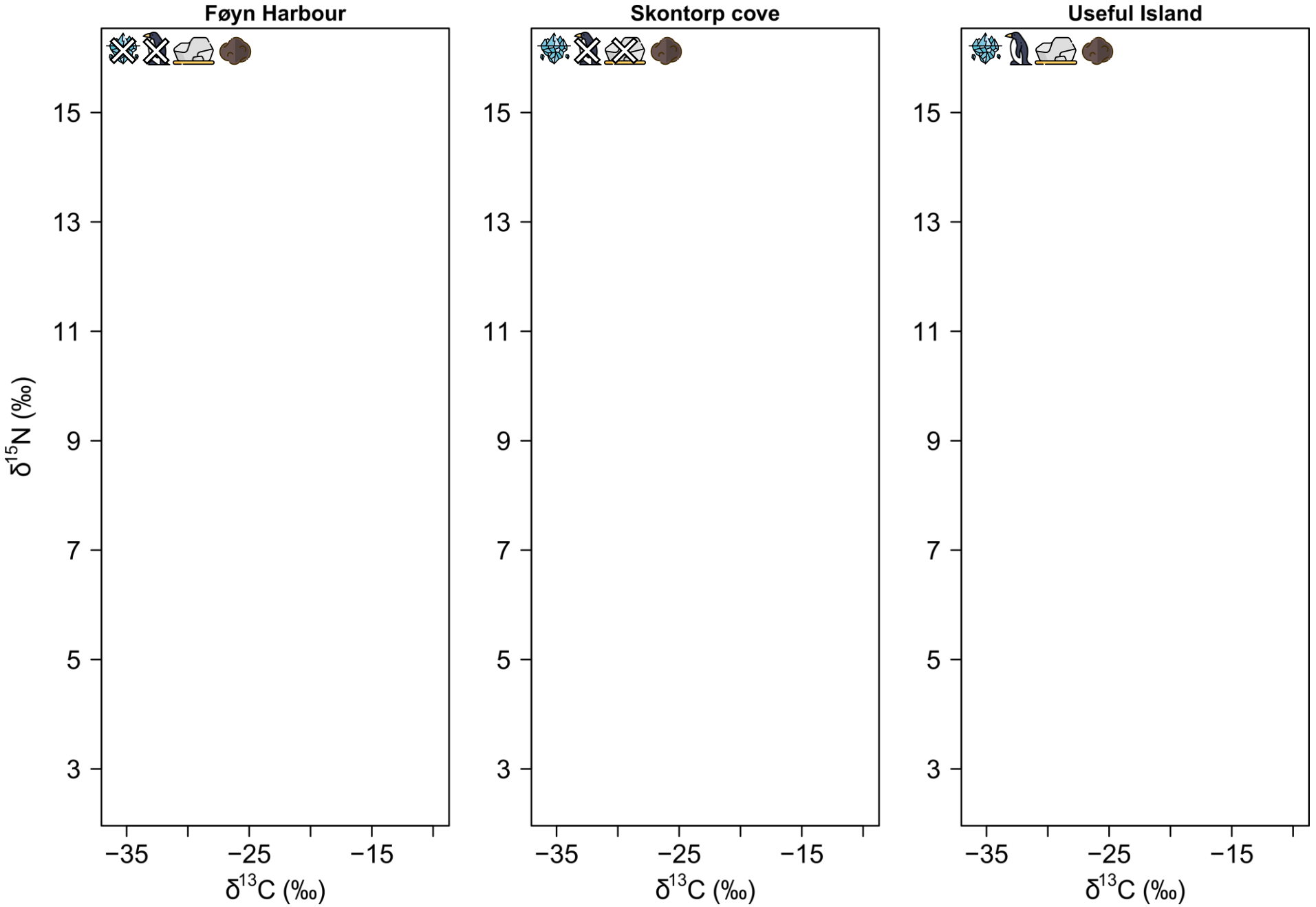
⇨ ~650 organisms from several functional groups: food sources, grazers, suspension feeders, omnivores, predators, scavengers

⇨ IRMS analyses: $\delta^{13}C$, $\delta^{15}N$ & $\delta^{34}S$

RESULTS

$\delta^{15}N$ / $\delta^{13}C$

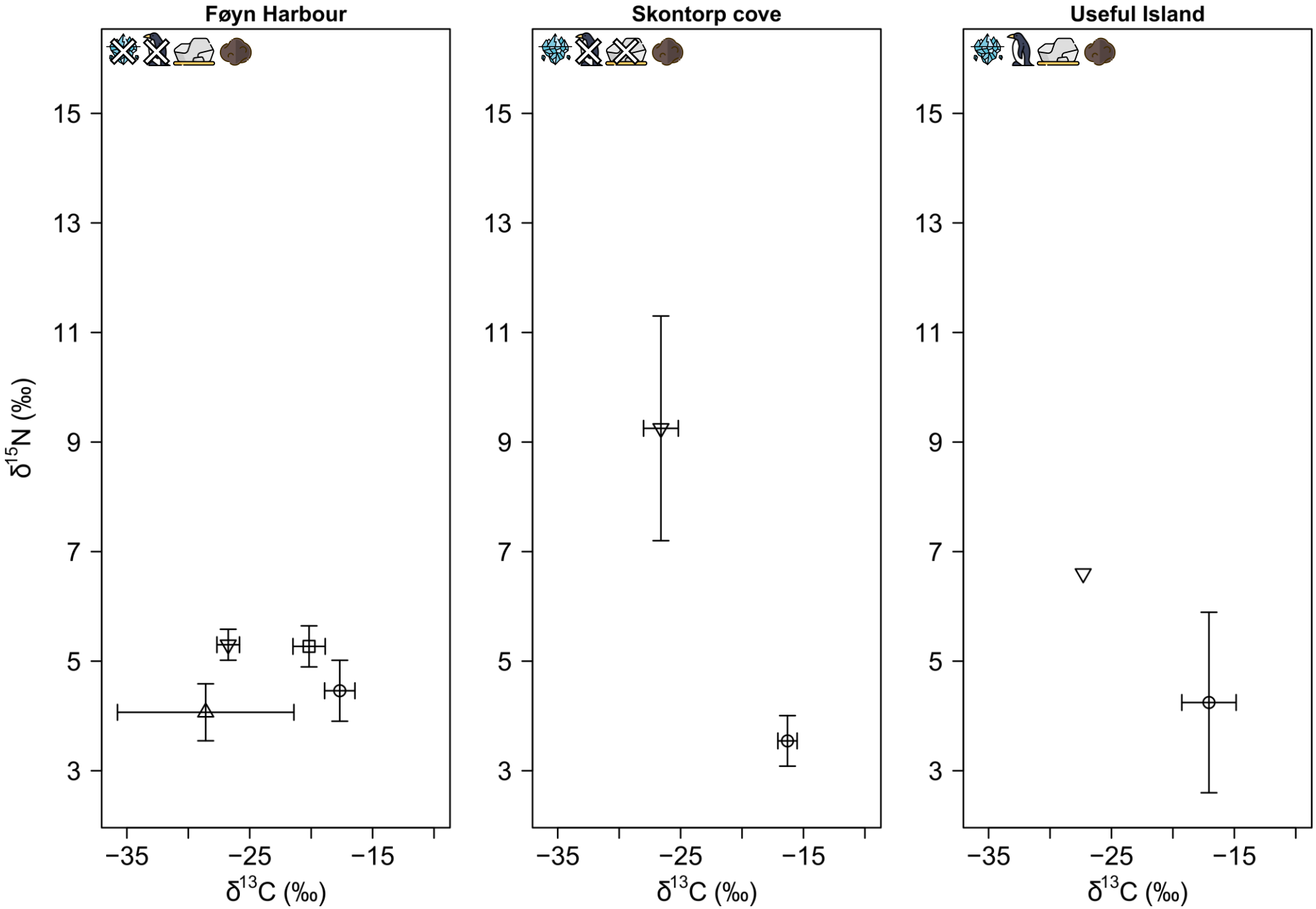


RESULTS

$\delta^{15}N$ / $\delta^{13}C$

Higher δ variability under ice disturbance

Food sources
- *Iridaea cordata*
- Macroalgae
- *Trematocarpus antarcticus*
- SPOM



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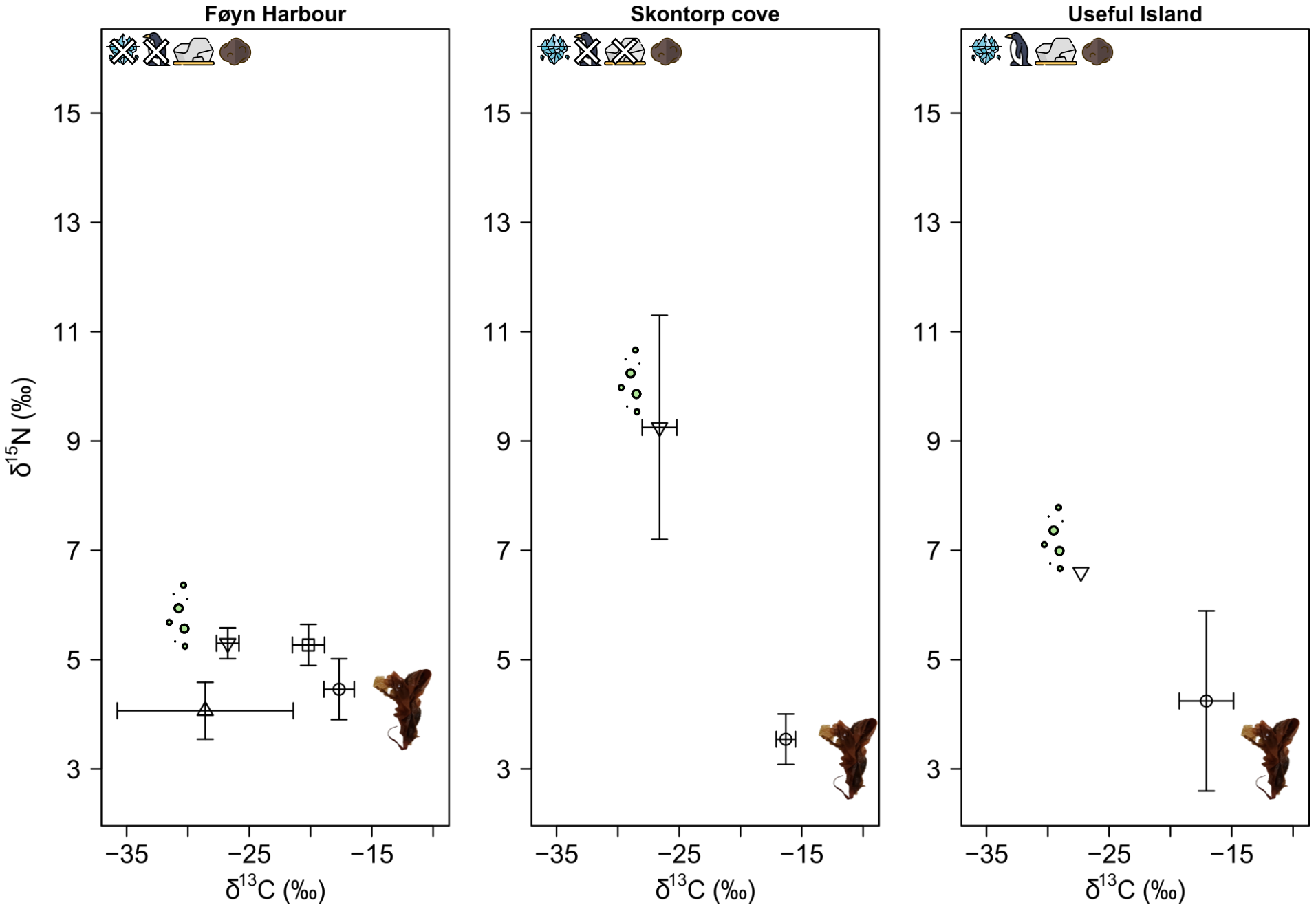

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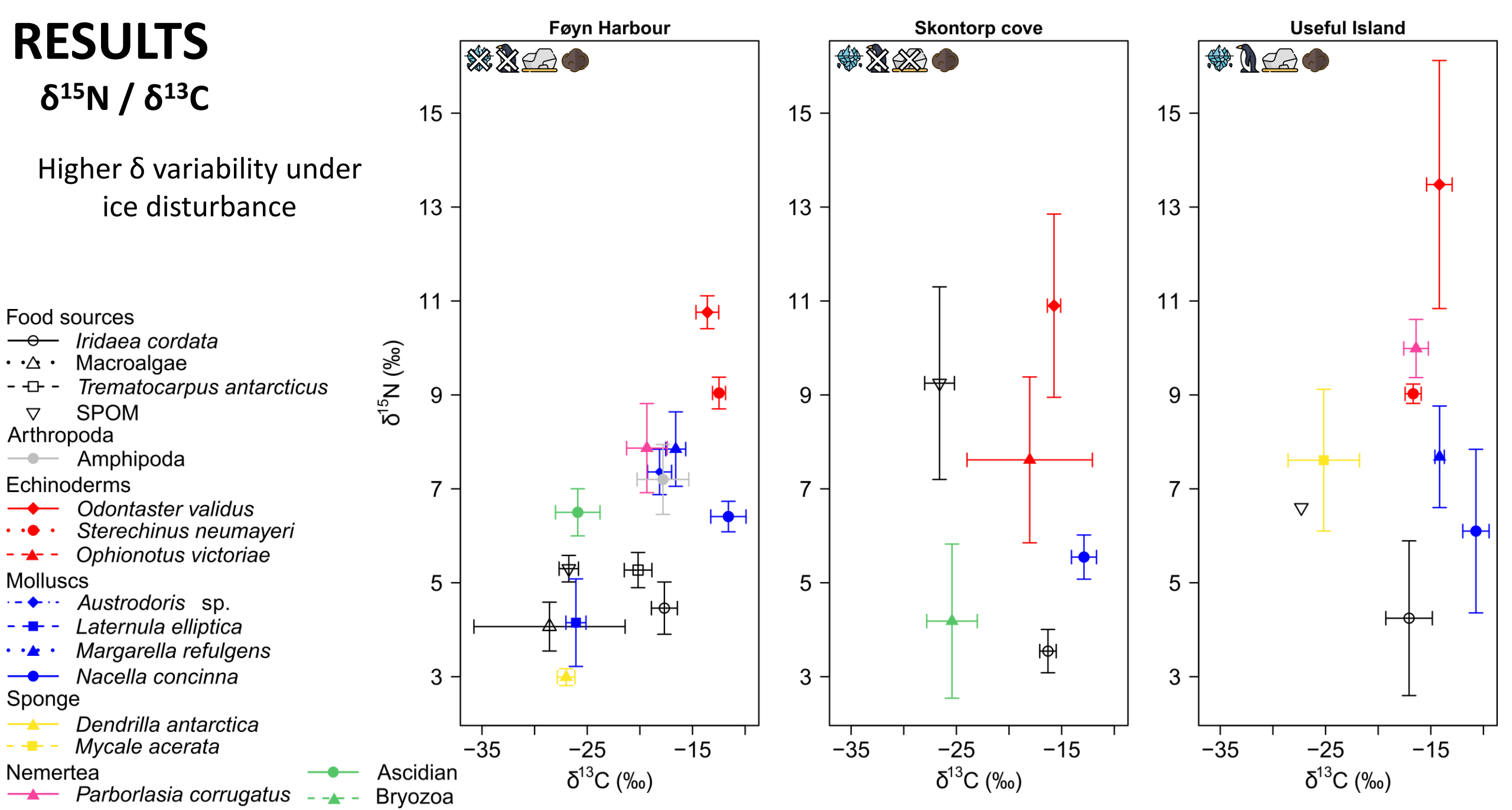

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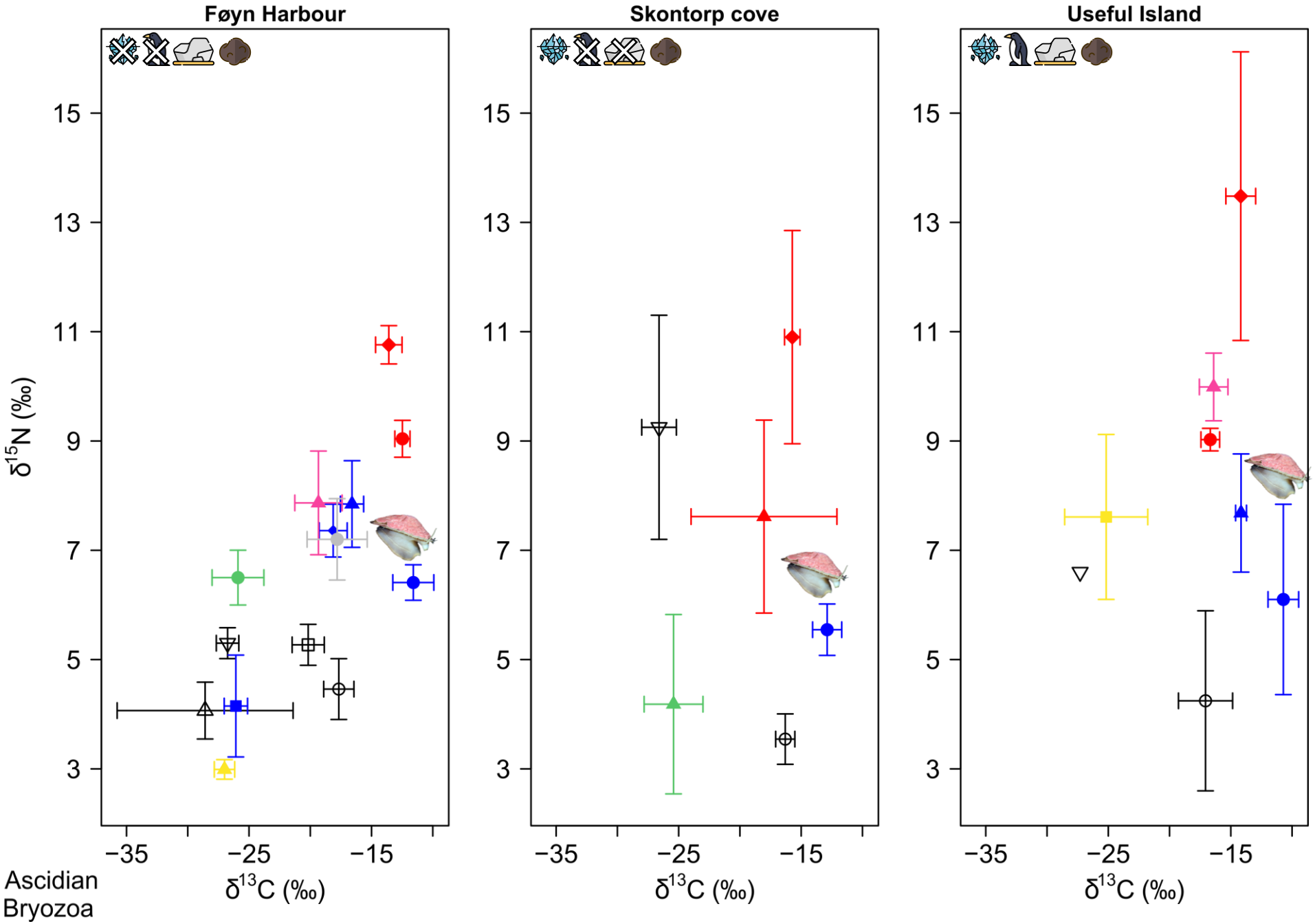

Food sources
- *Iridaea cordata*
- Macroalgae
- *Trematocarpus antarcticus*
- SPOM

Arthropoda
- Amphipoda

Echinoderms
- *Odontaster validus*
- *Sterechinus neumayeri*
- *Ophionotus victoriae*

Molluscs
- *Austrodoris* sp.
- *Laternula elliptica*
- *Margarella refulgens*
- *Nacella concinna*

Sponge
- *Dendrilla antarctica*
- *Mycale acerata*

Nemertea
- *Parborlasia corrugatus*

- Ascidian
- Bryozoa

RESULTS

$\delta^{15}N$ / $\delta^{13}C$

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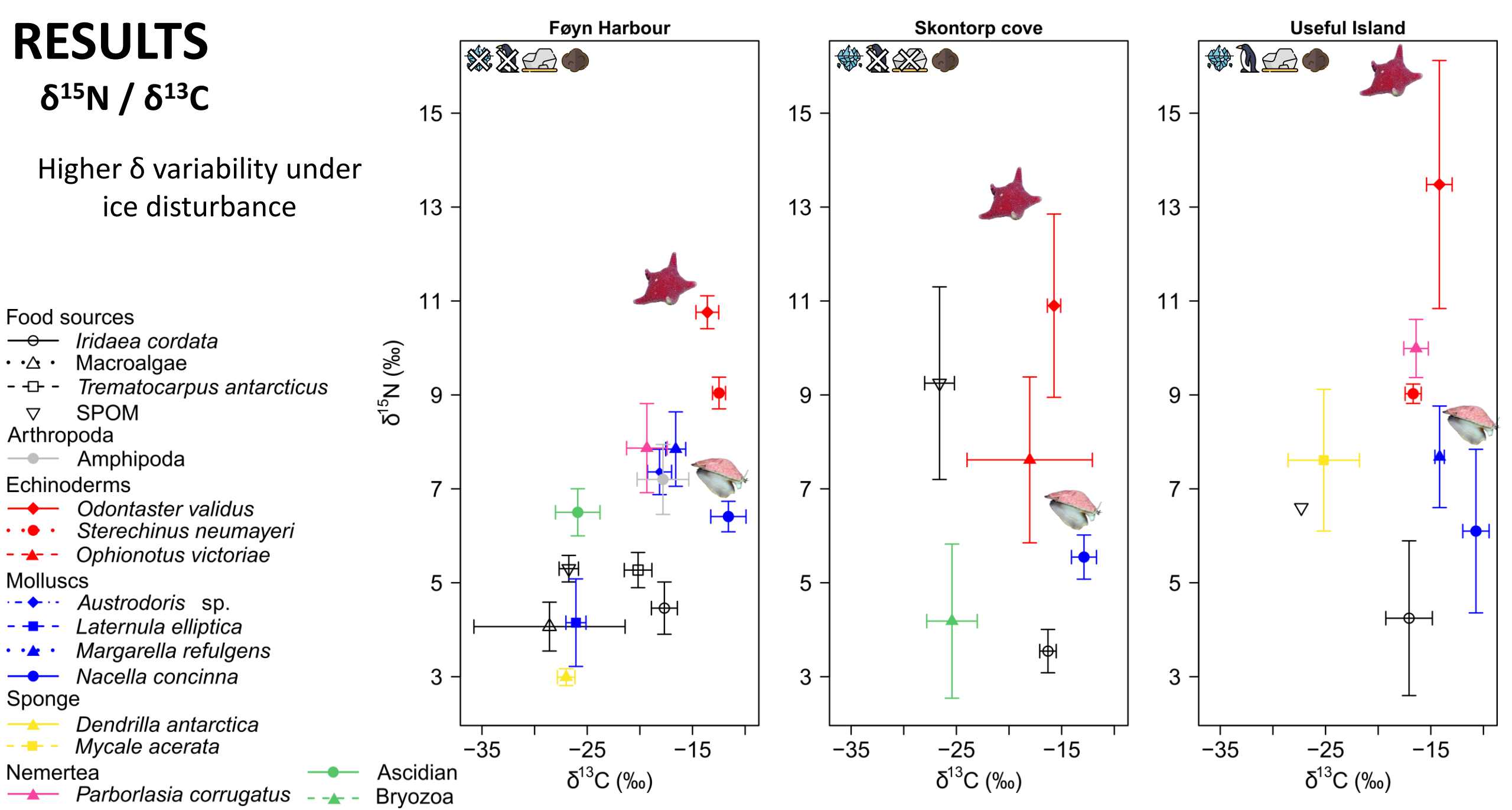
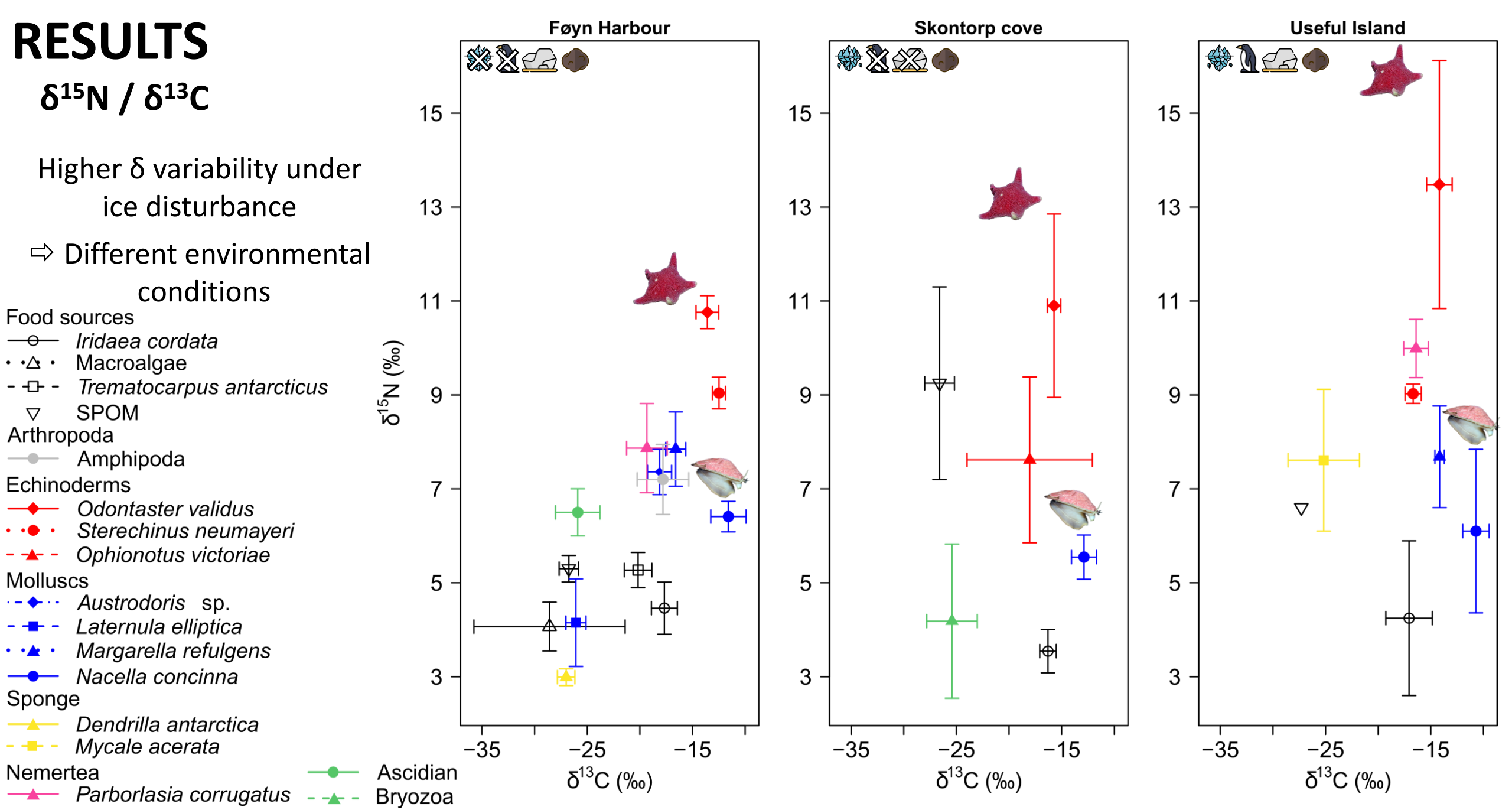


RESULTS

$\delta^{15}N$ / $\delta^{13}C$

Higher δ variability under ice disturbance

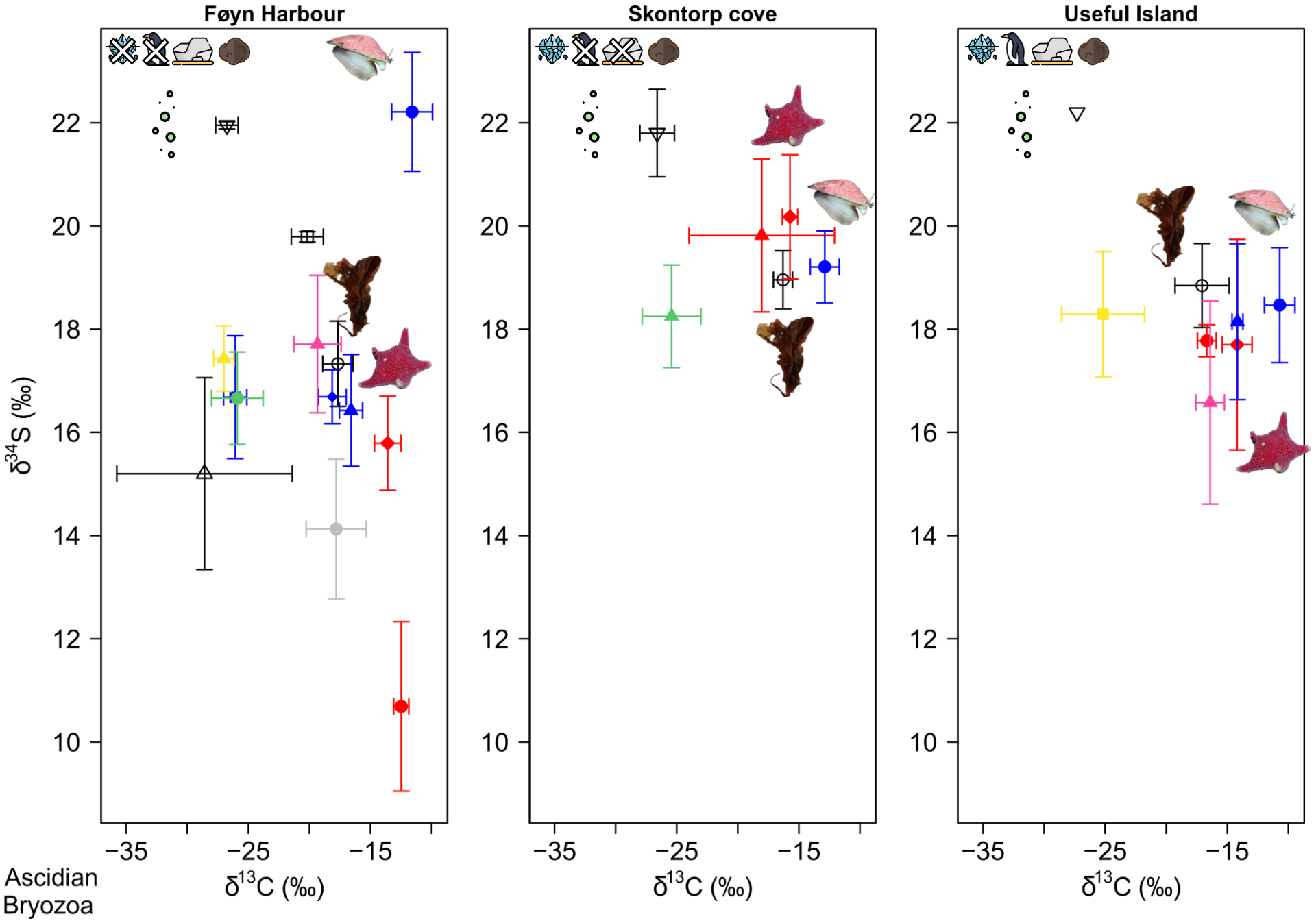
⇨ Different environmental conditions



RESULTS

$\delta^{34}S$ / $\delta^{13}C$

Higher $\delta^{34}S$ range in Føyn Harbour



RESULTS

$\delta^{34}S$ / $\delta^{13}C$

Higher $\delta^{34}S$ range in Føyn Harbour

⇨ Food source availability under ice disturbance

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- Macroalgae
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Arthropoda
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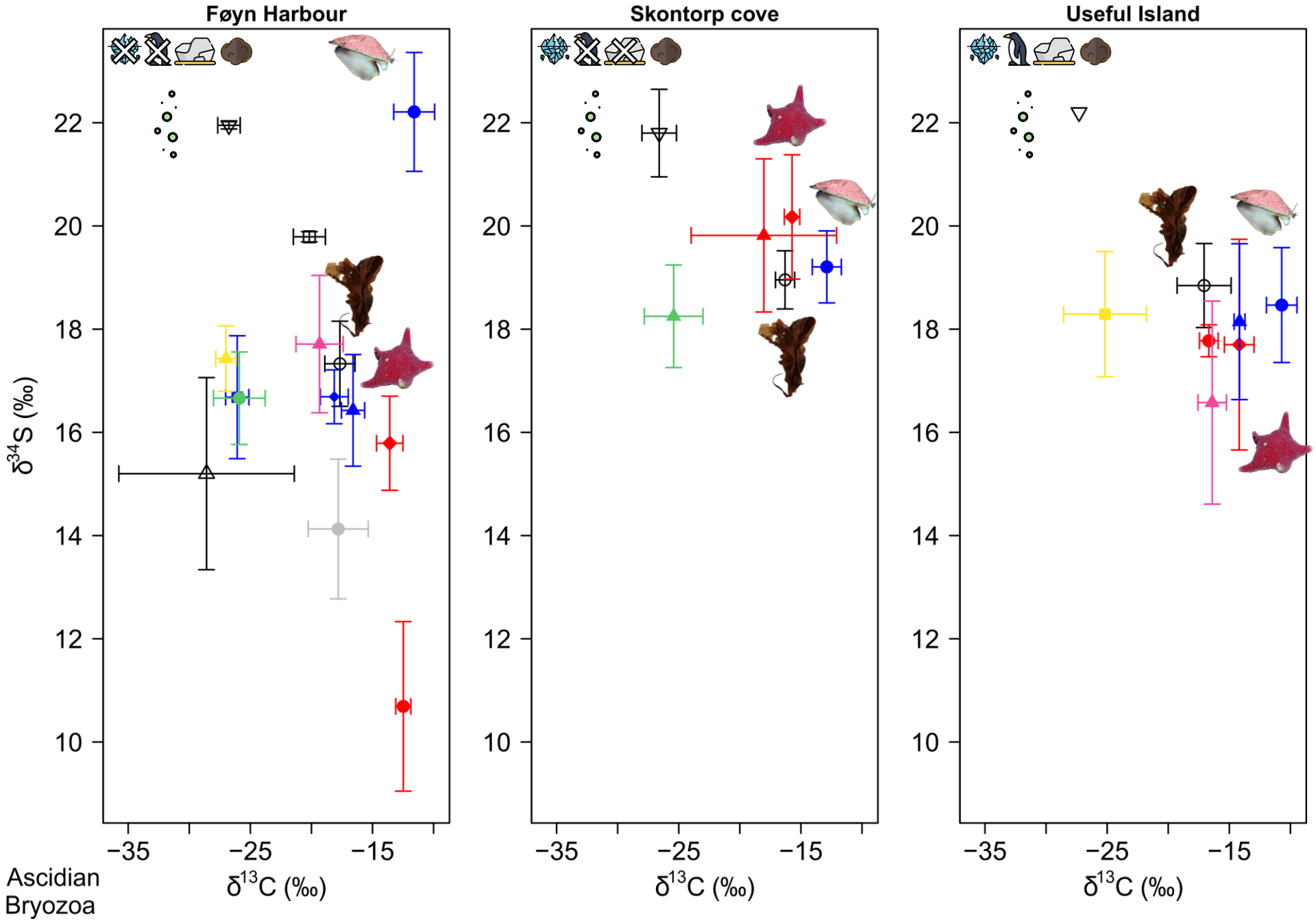
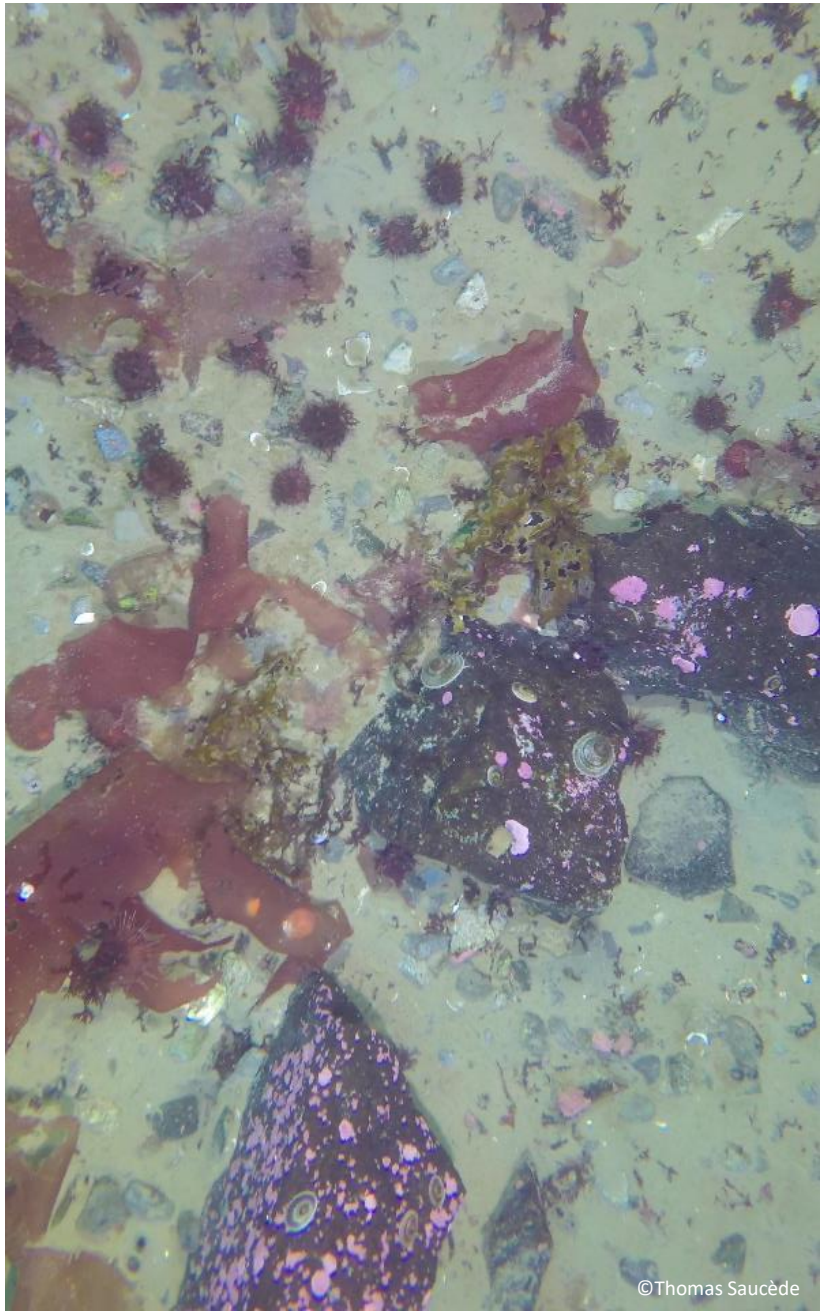


KEY POINTS

1° Trophic interactions

⇨ Changes in trophic niches

⇨ Different effects of disturbance



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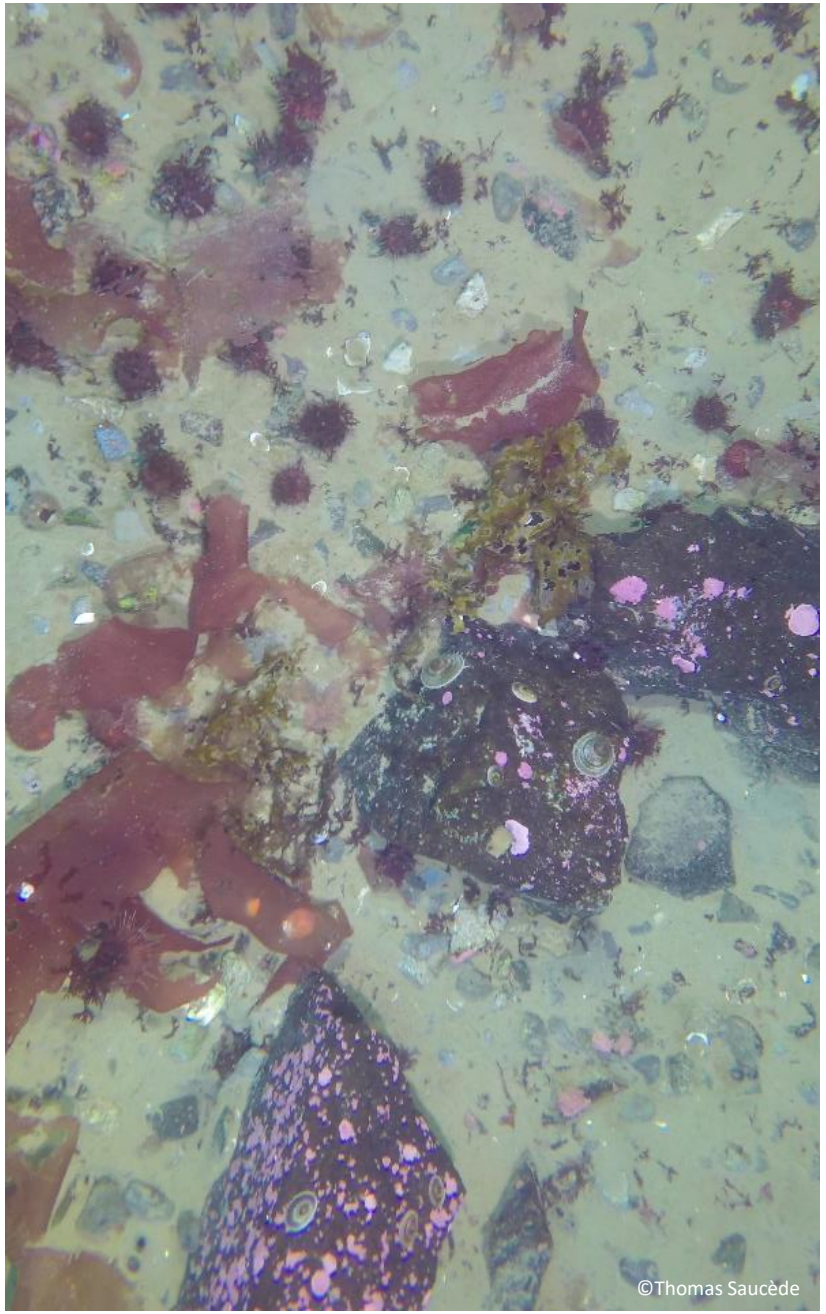
2° Environmental characteristics

⇨ Baseline characterisation

⇨ Specific features for each station



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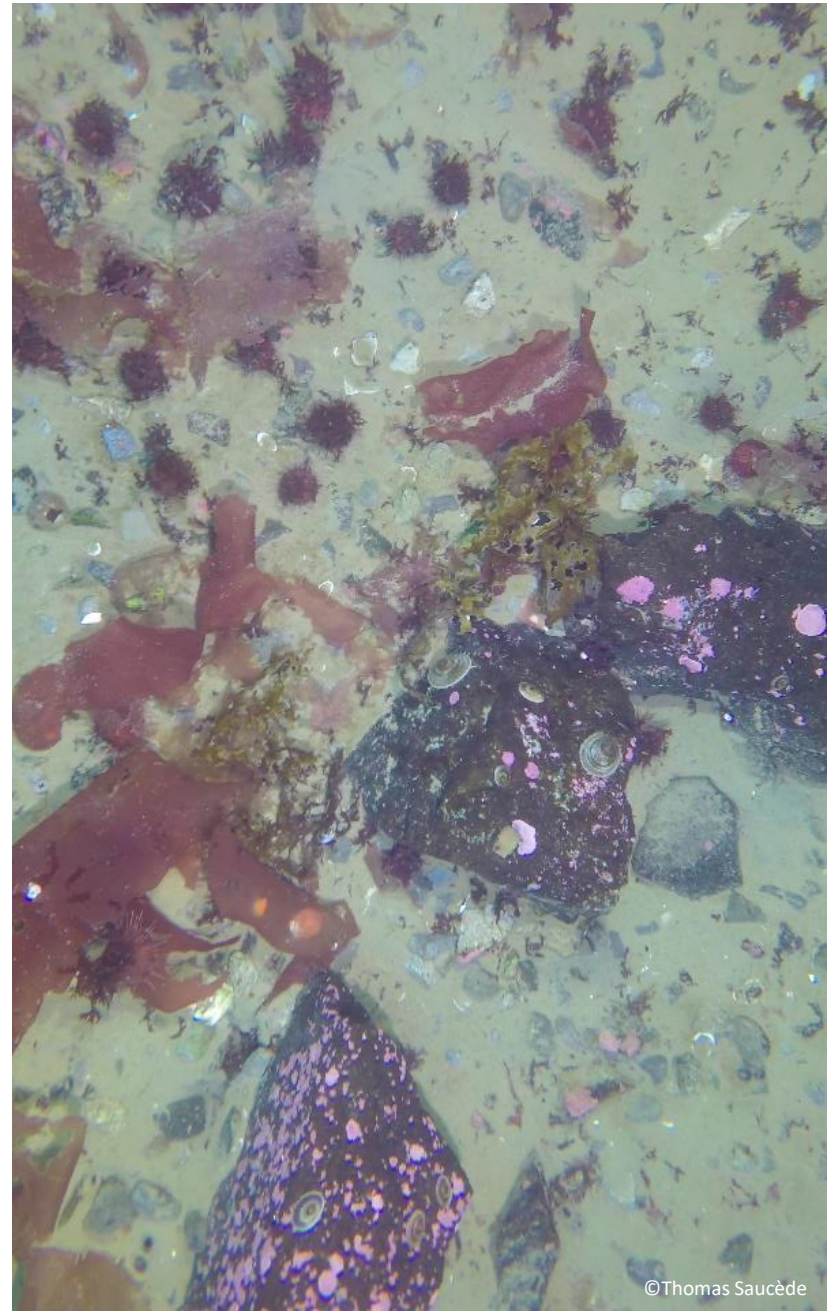
TANGO project
Estimating **T**ipping points in habitability of **AN**tarctic benthic ecosystems under **G**l**O**bal future climate change scenarios



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